AS/NZS 2299.1:2015

Australian/New Zealand Standard™

Occupational diving operations

Part 1: Standard operational practice

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-017, Occupational Diving. It was approved on behalf of the Council of Standards Australia on 16 March 2015 and on behalf of the Council of Standards New Zealand on 3 September 2015.
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The following are represented on Committee SF-017:

Association of Diving Contractors, New Zealand
Australian Council of Trade Unions
Australian Diver Accreditation Scheme
Australian Diving Contractors Association
Australian Marine Sciences Association
Australian Medical Association
CSIRO Marine and Atmospheric Research
Department of Defence, Australia
International Marine Contractors Association
Maritime Union of Australia
National Association of Occupational Diver Training Establishments
National Institute of Water and Atmospheric Research
New Zealand School of Commercial Diver Training
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Occupational diving operations

Part 1: Standard operational practice

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-017, Occupational Diving, to supersede AS/NZS 2299.1:2007.

This Standard is the initial Part of a series of Standards for the conduct of occupational diving operations. It is intended for application to all diving operations, however, diving operations in specific sectors of the diving industry for which other Parts in the AS/NZS 2299 series are published may be conducted using either this Standard or the sector-specific Standard. At the time of publication, sector-specific Standards for scientific diving, recreational industry diving and film and photographic diving were published.

The objective of this revision is to clarify and update the Standard and to reflect the requirements of the regulatory authorities. Significant differences from the 2007 edition include the following:

(a) Revised guidance for the use, calibration and testing of the various pressure gauges used in diving operations.

(b) A review of the provisions for breathing gas quality, with a specific emphasis on the following:

  (i) Simplification of determining acceptable water content to avoid risk of condensation or freezing.

  (ii) Acceptable composition of breathing gases, including gas used for enriched air nitrox (EAN) diving.

  (iii) A review of the testing and monitoring requirements for breathing gas quality.

(c) A review of the flange requirements and further considerations for the use of worksite chambers.

(d) The introduction of a maximum partial pressure of oxygen to be breathed by the diver.

(e) The addition of a section on the specific requirements for EAN diving, which includes—

  (i) equipment requirements;

  (ii) breathing gas supplies for SCUBA and SSBA; and

  (iii) EAN procedures.

(f) A minor review of medical requirements.

(g) A review of the guidance for medical practitioners in Appendix M.

(h) The removal of reference to specific decompression tables for diving.

Standards Australia has been unable to renew copyright approval for the publication of an extract from the DCIEM tables, and accordingly these have been removed from this version of the document.

The illustrations for the hand signals shown in Appendix K are reproduced with the permission of PADI.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendices to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard provides organizational and logistical requirements for the conduct of occupational diving operations, including the use of compressed gas supply apparatus, and specific requirements for the use of surface-supplied breathing apparatus (SSBA) and self-contained underwater breathing apparatus (SCUBA) in occupational underwater operations at depths not exceeding 50 m (165 ft).

1.2 OBJECTIVE

The objective of this Standard is to provide persons engaged in, or connected with, occupational diving with a set of requirements to promote uniformity of practice in relation to health and safety.

1.3 APPLICATION

This Standard applies to persons directly involved in occupational diving operations and industries either employing those persons or supplying equipment for use in connection with occupational diving operations. This Standard provides requirements for diving activity using air or enriched air nitrox (EAN) mixtures at depths not exceeding 50 m.

Other Parts of the AS/NZS 2299 series have been prepared to provide specific requirements for particular types of diving, such as scientific diving and diving in the film and photographic sectors. These other Parts of the AS/NZS 2299 series are intended to be read in conjunction with the relevant requirements of this Standard.

In addition, this Standard is intended to act as a useful resource to guide organizational, logistical and safety-related aspects of all occupational diving activities, including those that fall outside the stated scope of this Standard.

If diving operations beyond the scope of this Standard are to be undertaken, then additional training and procedures will be necessary to ensure the safety and competency of the dive team.

This Standard may be used for guidance for diving activities in liquids other than water and for diving with non-standard breathing apparatus systems, such as hookah or rebreather units, subject to the appropriate additional training and procedures.

This Standard does not apply to the conduct or teaching of recreational diving, although the guidance on medical fitness for occupational diving is relevant.

This Standard does not apply to non-diving work in pressurized atmospheres, such as in tunnels or caissons, or in hyperbaric treatment facilities in hospitals, which are covered by AS 4774.1 and AS 4774.2 respectively.

NOTES:

1 Recreational industry diving is covered by AS/NZS 2299.3.

2 For recreational diving, the relevant regulatory authority needs to be consulted. A list of relevant regulatory authorities is given in Appendix A.

1.4 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS
1210 Pressure vessels

1349 Bourdon tube pressure and vacuum gauges

2030 Gas cylinders
2030.1 Part 1: General requirements

2815 Training and certification of occupational divers (series)

3848 Filling of portable gas cylinders
3848.2 Part 2: Filling of portable cylinders for self-contained underwater breathing apparatus (SCUBA) and non-underwater self-contained breathing apparatus (SCBA)—Safe procedures

4484 Gas cylinders for industrial, scientific, medical and refrigerant use—Labelling and colour coding

AS/NZS
1337 Personal eye protection
1337.1 Part 1: Eye and face protectors for occupational applications

2815 Training and certification of occupational divers (series)
2815.5 Part 5: Dive supervisor

ANSI/ASME
Boiler and Pressure Vessel Code

1.5 DEFINITIONS

For the purpose of this Standard, the definitions below apply:

1.5.1 Animal enclosure pool

A permanent, man-made tank, pool, moat or stream that is constructed as part of an animal enclosure.

1.5.2 Aquarium

A permanent, man-made tank or pool, in which aquatic animals are housed for exhibition.

1.5.3 Bottom time

The total elapsed time from when a diver leaves the surface to the time (next whole minute) at which ascent is commenced, measured in minutes.

1.5.4 Breathing gas

The compressed gas intended for respiration by the diver.

1.5.5 Buddy system

A system used between divers to continually monitor and communicate with each other through visual or other means in order to render immediate assistance if required or in an emergency.

1.5.6 Built-in breathing system (BIBS)

A system whereby oxygen or other breathing gas is supplied to a person in a compression chamber via a respiratory demand-triggered gas supply device and oronasal face mask located inside the chamber.

1.5.7 Caisson gauge

A pressure gauge specifically designed for use inside pressure vessels.

1.5.8 Combined dive

The bottom times of more than one dive, added together and treated as a bottom time for a single dive to the deepest depth for the purpose of determining decompression requirements.

1.5.9 Competent person

A person who has acquired through training, qualifications or experience, or a combination of these, the knowledge and skills to enable that person to perform a specified task.

1.5.10 Compression (recompression) chamber

A surface chamber in which persons may be subjected to pressures equivalent to or greater than those experienced when under water, or under conditions which simulate those experienced on an actual dive.

NOTE: For the purpose of this Standard, 'compression chamber' is taken to include 'recompression chamber'.

1.5.11 Decompression illness

A generic term for acute illness resulting when pathological consequences arise from decompression. This term covers the condition known as decompression sickness (also known as bends) and arterial gas embolism, but does not include barotrauma of ascent.

1.5.12 Decompression schedule

A specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table; it is normally described as a series of stops at specified depths (in metres or feet) for specified times (in minutes).

1.5.13 Decompression stop

The specific length of time that a diver needs to hold their ascent at a specified depth to allow for the elimination of sufficient inert gas from the body to allow a safe ascent to the next decompression stop or the surface.

1.5.14 Demand gas supply device

A device that provides breathing gas to the diver via a mechanism which provides a flow of breathing gas when the diver inhales.

1.5.15 Dive control position

A single, designated location on the surface, normally adjacent to where a diver enters the water, from which it is possible to monitor all systems and functions which relate to the life support and safety of a diver in the water.

1.5.16 Dive plan

A set of procedures for a given diving operation.

1.5.17 Dive supervisor

A competent person who supervises diving operations.

1.5.18 Dive team

The group of people, including the dive supervisor, diver(s), attendant(s) and other personnel as required, who are—

(a) present at the dive site;

(b) directly involved in the dive;

(c) responsible for the safe conduct of the diving operation; and

(d) responsible for the availability and conduct of emergency procedures.

1.5.19 Diver

A person who performs diving work underwater or is exposed to pressure in association with diving work.

1.5.20 Diver's hose

Flexible tubing used to carry breathing gas to the diver from a remote location.

1.5.21 Diver's umbilical

An assembly of hoses and cables, which supplies breathing gas, is used for communication and diver monitoring, and incorporates a strengthening member. The umbilical may also contain other components, such as a hot water supply, and perform other functions between a surface control point and a diver.

1.5.22 Diving work

Work which is conducted using underwater breathing apparatus and work by the dive team in direct support of the diver.

1.5.23 Employer

A corporation or individual employing or engaging a person or persons either under a contract of employment, apprenticeship or traineeship, or for work. This includes self-employed persons.

1.5.24 Enriched air nitrox (EAN)

A breathable mixture of nitrogen and oxygen with more than 21% oxygen content, which may also contain trace gases at levels no higher than found in breathable air.

1.5.25 Exceptional exposure dive

A dive where the maximum recommended dive time for a particular depth (sometimes shown by a limiting line in decompression tables) is exceeded by a diver at that depth.

1.5.26 Float line

A line connecting the diver to a high visibility float on the surface of the water enabling the approximate location of the diver to be known at all times.

1.5.27 Free-flow system

A breathing method used in SSBA diving operations whereby breathing gas enters the full-face mask or incompressible helmet in a continuous flow and is not controlled by a demand gas supply device.

1.5.28 Full-face mask

A face mask that—

(a) encloses the total area of the face; and

(b) incorporates an integral breathing system.